from the desk of

[redacted]

25X1

18 August 1981

File SAFE.

To: Bruce Johnson

Bruce--

This is a quick look at the possibility of an alternate communications approach on SAFE Block I. Based upon my latest review of BIU/PIU development and production costs, we would recommend to stay on our present path.

Production cost estimates which have been rumored about, are based on very small production quantities. We will provide to you in the near future a cost vs. production quantity estimate which we will update each month.

25X1

cc: [redacted]

TRW
DEFENSE AND SPACE SYSTEMS GROUP
ONE SPACE PARK- REDONDO BEACH • CALIFORNIA 90278

81.2514.1-001

INTEROFFICE CORRESPONDENCE

STAT TO: [redacted]

CC: T. R. Savage

DATE: 14 August 1981

STAT

SUBJECT: Contingency Terminal Communications for SAFE

FROM [redacted]
BLDG. 126 MAIL STA. 2339 EXT. 517-7208

INTRODUCTION: The primary terminal communications subsystem for SAFE is based on a coaxial cable distribution system utilizing Bus Interface Units (BIUs) and Processor Interface Units (PIUs) to interface the terminals and host respectively. To this system is added a cryptographic overlay by means of GFE equipment.

The major elements of this subsystem then are as follows:

1. Coaxial cable distribution system
2. Bus Interface Units
3. Processor Interface Units
4. GFE Cryptographic Equipment

PROBLEM: At this point in the SAFE system development, only the coaxial cable distribution has been designed, developed and installed. The other elements, including the GFE equipment, are still in development phases. Schedule problems with any of these elements could impact the timely delivery of the SAFE system. As a result, the contingencies described in this paper have been developed.

ASSUMPTIONS: Each of the contingency plans assumes that some aspect of SAFE performance requirements could be modified or relieved during the period of use of that specific contingency. The overall goal is to provide the maximum SAFE functionality and performance possible under each plan.

A further assumption is that the SAFE PIU, SAFE BIU and GFE Cryptographic equipment must be used as a set and that the lack of any element prohibits the use of the other two. This leaves only the coaxial cable as a SAFE provided candidate for use in contingency planning.

There are two primary media which could be utilized to link SAFE user terminals to the SAFE System. These are the coaxial cable system already described, and the wire grid system which exist within the customers facility. Each means has advantages and disadvantages which are individually discussed.

SOLUTION A. Coaxial Cable System

The BIUs and PIUs under development for SAFE are relatively complex due to specific performance and security requirements. A less complex BIU has been developed for less stringent applications and in fact will be used within the SAFE Development Facility to link SAFE terminals with the SAFE Host processors. This device does not meet the performance or security requirements for SAFE but represents a viable method for providing terminal to host communication in a "SAFE like" environment.

This approach preserves the inherent connectivity and flexibility of the SAFE Wideband Communications (WBC) subsystem by allowing freedom of terminal location and allowing any user to connect to any user level host processor. The primary disadvantages of this system are that it will not support user community growth past a few hundred (should be sufficient for Block 1) and that end to end encryption is not compatible with this system although TEMPEST is possible. A waiver would be required to pass RED data over the coaxial cable system.

SOLUTION B. Wire Grid System

The wire grid represents the established method for providing the terminal to host connection. Older installations of this wire grid utilized two twisted pair to each required terminal location. Because of the terminal interface for SAFE, these older grid installations are not suitable. Fortunately, new installations on the wire grid utilize 4 to 6 twisted pair and would support the SAFE terminals. This grid is also shielded and used to pass RED data as is.

Because the SAFE host processors are not normally configured to drive large wire grid systems with the appropriate terminal interface, some electrical interface conversion hardware would be required at the host to grid interface.

The primary disadvantages to the wire grid approach are that all SAFE terminals will require "new installation," that is 4 or 6 pair service; the placement of the terminals will be relatively fixed after wire grid installation; and most importantly, the wire grid does not support the terminal to multiple host connectivity which is inherent in the SAFE architecture.